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162. *A. caninum* Reich.; Wheat grass.
163. *A. violaceum* Beauv.; Wheat grass.

54. HORDEUM L.

- a. Awns about 2 inches long, spike bushy in appearance..... 164
a. Awns about $\frac{1}{2}$ -inch long, spike not so bushy..... 165
164. *Hordeum jubatum* L.: Squirrel-tail grass.
165. *H. pusillum* Nutt.; Small Squirrel-tail grass.

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a. Culms about a foot high (seldom 2 ft.), outer glumes long awned..... 169
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THE HUMAN EYE: THE CHANGES WHICH OCCUR IN MIDDLE LIFE.

BY W. D. BIDWELL, A.M., M.D., LEAVENWORTH, KANSAS.

The following are the changes which occur in the eye in or near middle life, which we will consider briefly:

First, that condition known as Presbyopia, or the sight of old age.

Second, Cataract.

Third, Myopia, or near-sightedness.

Fourth, Epiphora, or the overflow of tears upon the cheek.

The condition known as Presbyopia is due to a change in the consistency of the crystalline lens. In infancy the lens is composed of a somewhat elastic substance, held in position by a membrane known as the suspensory ligament; the posterior surface is more convex than the anterior, but when the suspensory ligament is relaxed the natural elasticity of the lens causes it to become more convex, particularly anteriorly, bringing the focus nearer the eye and at the same time the iris contracts, shutting out rays which would be rendered too divergent to come to a focus on the retina. In process of time the lens grows larger, heavier and less elastic, so that the focal distance for the eye or the distance of the near-point, as it is called, becomes greater, and when it exceeds ten inches, which is usually between the ages of forty and forty-five years, reading becomes tiresome or impossible, because at the distance at which the book is ordinarily held, the whole accommodation (that is, relaxation of the ligament referred to above) which is available has to be used, and hence fatigue is soon experienced; while if the book is held further away only large print can be read, because of the diminution in the size of the retinal images. The remedy for this is supplementing the accommodation by convex spectacles of such a strength as to bring the near-point back to nine inches. The hardening of the lens

being progressive, it becomes necessary to use a stronger glass every few years. Presbyopia may occur before the age of forty, but is to be distinguished from Hypermetropia, or far-sightedness, a condition due to a shortening of the globe of the eye itself, which may be congenital, or develop at an early age. The two are often confounded, owing to the fact that a convex glass is worn in either case; but hypermetropia is far more difficult of correction, owing to the fact that it is rarely detected in its incipency, and in the effort to bring rays of light from near objects to a focus on the retina the patient strains the accommodation, producing a condition of spasm, sometimes associated with squinting, and this spasm is very difficult to relax. Jewelers and trade dealers in spectacles frequently fail to give satisfaction in fitting glasses, because they do not understand the pathology of spasm, and a glass which suited the patient in the store may prove very unsatisfactory when worn constantly for an hour or two at home.

Cataract, so called from its causing a blindness like that of a veil falling over the eye, is a cloudy or opaque condition of the crystalline lens, which prevents the passage of rays of light to the retina. The causes are still obscure; but it occurs more often with certain diseases such as diabetes and ergotism, after injuries to the eye, in persons of dissipated habits, and often with no other apparent cause than the lowering of vitality due to advancing years. The ordinary senile cataract is of slow formation, from two to four years intervening between the first symptoms and that condition of hardness in which it is said to be ripe. The opacity may begin in the center, at the periphery, or at the poles. When it begins in the center or at the poles there is better vision on dark or dull days, or when the eye is shaded, for then the pupil dilates, and rays pass through the as yet unclouded periphery of the lens. The symptoms of cataract are: Failing vision, unimproved by glasses, and more marked in one eye than in the other. Later, the pupil, which formerly was black, shows a cloudy gray or purplish appearance; and examination by oblique illumination and the use of the ophthalmoscope shows the seat and extent of this cloudiness. During the earlier stages of cataract, the fundus of the eye can be seen with the ophthalmoscope, and it is very important that a careful examination should be made at this time, to determine the advisability of an operation when the whole lens becomes opaque. No treatment is of any avail, except removal of the lens when it is ripe, or, in selected cases, the making of an artificial pupil by removing a small portion of the iris from in front of a clear portion of the lens. Even when a cataract is ripe the patient is not absolutely blind, for, when placed facing a window, he will detect a hand passed between him and the light, and in a dark room he is able to tell the position of a lighted candle placed before him or at one side. When this perception of light is lost, there is some other defect, and operation is not advisable; but in all ordinary cases, after the cataract is removed, very good vision is secured by placing strong convex lenses in front of the eye. It must be remembered, however, that the accommodation is lost, and lenses of different foci are required for seeing at varying distances.

Several of the leading oculists have made themselves famous by devising new operations for cataract. Formerly the lens was dislodged from its position by needles, and pressed back into the vitreous humor; but now the favorite operation is to remove the lens bodily by an incision through the cornea, and the principal difference of opinion is as to the advisability of removing a portion of the iris first, or pressing out the lens, and running the risk of bruising the iris during the operation.

Dr. Valk, with whom I spent some time during a recent period of study in New York, has devised an operation by which he presses back the iris with retractors during the exit of the lens, thus avoiding the dangers of inflammation of the iris, and securing a perfectly round and movable pupil after the operation.

Before leaving the subject of cataract, I will just mention one fact that is frequently misleading. In commencing cataract, the refractive power of the nucleus of the lens may be increased so that one who had been compelled to wear convex glasses for presbyopia is enabled to leave them off: hence, they imagine their sight is improving with age, whereas it is on the road to a more rapid failure.

Having referred to hypermetropia, or far-sightedness, in connection with presbyopia, it would not be quite fair to entirely ignore the opposite condition of myopia, or near-sightedness, as it is called. Myopia is usually due to a lengthening of the globe of the eye, as a result of weakness of the tunics. It may be congenital, but more often comes on during childhood. The employment of the eyes, in childhood, for near work, with a defective light, the head being bent over, will make the trouble much worse, if, indeed, it is not sufficient to originate myopia. A feeble condition of the system tends to increase the trouble, and in many cases the vitreous finally becomes fluid, and opacities are seen in it and in the lens. With proper care, the disease progresses but slowly in the majority of cases; but with abuse of the eye, stronger glasses are required at frequent intervals, and the vision becomes very feeble. The remedy consists in wearing a proper glass, and in avoiding the causes already mentioned.

The only other disease I will refer to at this time is Epiphora, or the overflow of tears upon the cheek. Normally the tears are discharged through several small canals coming from the lachrymal sac in the upper and outer corner of the orbit, over the front of the eye, and are taken up through two minute orifices, called the puncta lachrymalia, situated one in the upper and one in the lower lid at the inner angle of the orbit. These two open into canaliculi, which unite and form the lachrymal sac, and this in turn opens into the nasal duct discharging the tears into the nose. The orbicularis muscle, which closes the lids, sharing in the general diminution of vitality of the system, may become relaxed, and the puncta are then no longer applied to the surface of the globe, but point outward, and allow the tears to escape upon the cheek, giving rise to inflammation of the skin, and the unsightly appearance noticeable in many aged people. These cases are sometimes entirely relieved by the simple operation of opening up the canaliculi so that the tears are readily received into the sac; but others are only relieved by dilating the whole nasal duct, which evinces a decided inclination to close up if irritated by acrid discharges from the eye.

AN EXAMINATION OF THE RESINOUS EXUDATION OF ROSIN WEED.

(*Silphium Laciniatum*.)

BY PROFESSOR L. E. SAYRE.

(Abstract.)

The rosin weed exudes a resinous juice, which congeals in small transparent or translucent masses or tears. This resin is quite beautiful and interesting, and, it seemed to me, could be made of value in making a fluid for use in microscopic mounting.

On examination, this deposit proved to be quite a pure oleo-resin. It is soluble in chloroform, benzol, ether, and benzine. Alcohol and methyl alcohol dissolve it to some extent. The chloroform and benzol solutions are perhaps the best for microscopic purposes. They leave, upon spontaneous evaporation, a transparent residue. If the solution is evaporated, and the heat continued until the volatile oil is driven off, the residue makes a solution in benzol or chloroform which dries very rapidly into a thin, transparent film, which is well adapted to microscopic mounting.